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COMMENTS

Our Ref: 944-003.041, Application No: 9/717,784

Dear Le and Kristine:

I want to summarize our interview on September 8, 2005.

It was unfortunate that we could not use a speakerphone system for properly communicating. I would like to repeat the major points I raised during the interview:

1. Figure 10 of Smith et al. does not show any 3-dimensional appearance as recited in claim 1 (and other independent claims) of the present invention. Figure 10 only shows a two-dimensional profile of house and there is no 3-dimensionality or depth perception built in the picture whatsoever.
2. Figure 10 of Smith et al. does not have alternating dark and light stripe structure recited in claim 1 (and other independent claims) of the present invention.
3. Figure 10 of Smith only shows shadows indicating the edges of the icon (a house) and does not show highlights recited in claim 1 (and other independent claims) of the present invention.

Regarding comment 1, the Examiners did not provide any comprehensive answer during the interview.

Regarding comment 2, Ms. Kristine Kinkaid pointed out that, e.g., the dark line indicating the bottom of the house in figure 10 of Smith et al. can be interpreted as an alternating dark line per claim 1 of the present invention. I think that the dark line in Figure 10 referred to by Ms. Kinkaid is a shadow outlining the edge of the icon picture (a house), therefore it cannot be interpreted in the frame of claim 1 of the present invention as both the edge (shadow) outlining the icon edge and the alternating dark stripe: it is either one or another.

Moreover, regarding comments 2 and 3, both Ms. Le Hguyen and Ms. Kristine Kinkaid made statements regarding the fact that when the line length goes to zero it becomes a point but still can be regarded as a line, and the Examiner's arguments are based on that in rejecting claim 1. I disagree with a portion of this statement. I agree with the first part that the line becomes a point when its length goes to zero but it cannot be regarded as a line when its length goes to zero: it becomes a point (the line is defined by at least two points). I attach several pages of definitions of a line and a point from Wikipedia and nothing indicates there that a point can be interpreted as a line (please provide your alternative definition in any written reputable publication which you could not refer to during the interview). In other words, a single pixel of Smith et al. cannot be interpreted as a line, therefore the Examiner's arguments based on that assumption are wrong. Please consult your mathematical experts to clarify this definition, if necessary.

Furthermore, in the office action of August 10, 2005 the Examiner pointed out that "limitations from the specification are not read into the claims". During the interview I asked the Examiner to clarify this point and indicate which limitations she referred to, in other words what limitations, if added to claim 1 (and other independent claims), will make these claims allowed. No answer was provided.

In light of the above considerations I urge you to reconsider your position and possibly answer the questions raised during the interview (e.g., what limitations would further clarify claim 1) and possibly continue the telephone interview since it was not properly performed due to malfunction of the equipment. The prosecution of this case has lasted for more than two years drawing significant USPTO and our resources. It would be beneficial to everybody involved to find a comprehensive solution and resolve the dispute. I am looking forward to your response.

Best Regards,

A. Frenkel

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Line (mathematics)

From Wikipedia, the free encyclopedia.

A **line**, or **straight line**, is, roughly speaking, an (infinitely) thin, (infinitely) long, straight geometrical object, i.e. a curve is not always a line. Given two points, in Euclidean geometry, one can always find exactly one line that passes through the two points; the line provides the shortest connection between the points. Three or more points that lie on the same line are called ***collinear***. Two different lines can intersect in at most one point; two different planes can intersect in at most one line.

This intuitive concept of a line can be formalized in various ways. If geometry is developed axiomatically (as in Euclid's *Elements* and later in David Hilbert's *Foundations of Geometry*), then lines are not defined at all, but characterized axiomatically by their properties. "Everything that satisfies the axioms for a line is a line." While Euclid did define a line as "length without breadth", he did not use this rather obscure definition in his later development.

In Euclidean space $\mathbf{R}^n$ (and analogously in all other vector spaces), we define a line L as a subset of the form

$$L = \{\mathbf{a} + t\mathbf{b} \mid t \in \mathbf{R}\}$$

where **a** and **b** are given vectors in $\mathbf{R}^n$ with **b** non-zero. The vector **b** describes the direction of the line, and **a** is a point on the line. Different choices of **a** and **b** can yield the same line.

In a two-dimensional space, such as the plane, two different lines must either be parallel lines or must intersect at one point. In higher-dimensional spaces however, two lines may do neither, and two such lines are called skew lines.

One can show that in $\mathbf{R}^2$, every line L is described by a linear equation of the form

$$L = \{(x, y) \mid ax + by = c\}$$

with fixed real coefficients a, b and c such that a and b are not both zero (see Linear equation for other forms). Important properties of these lines are their slope, x-intercept and y-intercept. The eccentricity of a straight line is infinity.

More abstractly, one usually thinks of the real line as the prototype of a line, and assumes that the points on a line stand in a one-to-one correspondence with the real numbers. However, one could also use the hyperreal numbers for this purpose, or even the long line of topology.

The "straightness" of a line, interpreted as the property that it minimizes distances between its points, can be generalized and leads to the concept of geodesics on differentiable manifolds.

Contents

Line segment

In mathematics, a **line segment** is a part of a line that is bounded by two end points. See also interval (mathematics).

When the end points are both vertices of a polygon, the line segment is either an edge (of that polygon) if they are adjacent vertices, or otherwise a diagonal.

The **midpoint** of a line segment is its 'middle' point: the unique point at an equal distance from the two end points.

Ray

In Euclidean geometry, a **ray**, or **half-line**, given two distinct points A (the origin) and B on the ray, is the set of points C on the line containing points A and B such that A is not strictly between C and B.

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o----o-----*--->
A    B     C
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In geometric optics a **ray** or a (light) **beam** is a curve describing the direction in which light or other electromagnetic radiation is propagated. The ray in geometric optics is perpendicular to the wavefront in physical optics.

In most simple cases, light rays within a given medium are straight lines. Light passing from one medium to another undergoes refraction or total internal reflection following Snell's law.

See also

- Affine function
- Linear equation
- Linear function
- diffraction
- Glossary of Riemannian and metric geometry#R for its meaning in Riemannian geometry.
- incidence (geometry).

External links

- *Equations of the Straight Line (http://www.cut-the-knot.org/Curriculum/Calculus/StraightLine.shtml)*
- *Rigorous definition of a line (http://mathworld.wolfram.com/Line.html)*

Retrieved from "http://en.wikipedia.org/wiki/Line_%28mathematics%29"

Categories: Elementary geometry

Point (geometry)

From Wikipedia, the free encyclopedia.

A **spatial point** is an entity with a location in space but no extent (volume, area or length). In geometry, a point therefore captures the notion of *location*; no further information is captured. Points are used in the basic language of geometry, physics, vector graphics (both 2d and 3d), and many other fields. In mathematics generally, particularly in topology, any form of *space* is considered as made up of *points* as basic elements.

Points in Euclidean geometry

A point in Euclidean geometry has no size, orientation, or any other feature except position. Euclid's axioms or postulates assert in some cases that points exist: for example, they assert that if two lines on a plane are not parallel, there is exactly one point that lies on both of them. Euclid sometimes implicitly assumed facts that did not follow from the axioms (for example about the ordering of points on lines, and occasionally about the existence of points distinct from a finite list of points). Therefore the traditional axiomatization of *point* was not entirely complete and definitive.

Points in Cartesian geometry

Intuitively one can understand a location in the Cartesian 3D space. This location could be described with three real number coordinates: for instance

$$P = (2, 6, 9).$$

But one can also describe points in 1, 2 or more than 3 dimensions. The description of a point is quite similar to the description of a spatial vector, which also can exist in space with dimensions from one to many.

The conceptual difference between these notions is significant, though: a point indicates a location, while a vector indicates a direction and length. If a distinguished point (the *origin*) is given, one can describe a location by giving the direction and distance from the origin to that point.

One could argue that in this world it makes no sense to say that a point is in a one or two dimensional space, because we experience space in 3 dimensions, where one or two dimensions exists within this space, thus forcing 1d and 2d points to actually be 3d points. This way one could say that the only real *spatial points* are 3d points. And one could also argue that by giving more than 3 coordinates one starts to describe features which are not related to space (how would you describe the fourth dimension in spatial terms?) This is really a question about what we mean by *space*.

Points in differential geometry

to be written

Here is where the difference between points and vector becomes obvious; here is where the atomic nature of points becomes clear.

Retrieved from "http://en.wikipedia.org/wiki/Point_%28geometry%29"

Categories: Elementary geometry